Goddard Space Flight Center 2009 Sample Student Projects

Required Academic Level

Junior/Senior Undergraduate

Category

Earth Sci

Subcategory

Atmospheric Dynamics

Project Title

Summer Institute in Earth Sciences - Hurricane Intensity & Ocean Vertical Structure

Project Description

Hurricanes are amongst the most destructive natural disasters known to mankind. The primary energy source driving these storms is the latent heat release due to the condensation of water vapor, which ultimately comes from the ocean. The upper ocean vertical structure plays a key role in the formation and maintenance of such storms, while the Sea Surface Temperature (SST) has a direct correlation with wind speeds. Understanding the impact of these factors in the mutual interaction of hurricane□ocean is critical to more accurately forecasting intensity change in land-falling hurricanes. Use of hurricane heat content derived from the satellite radar altimeter measurements of sea surface height has been shown to improve intensity prediction. The general approach of estimating ocean heat content uses a two layer model representing the ocean using the surface height anomaly from the altimeter data. Although these estimates compare reasonably well with in situ measurements, recent studies show that there is room for further improvement. A simple multilayer model is proposed to improve the estimation of upper ocean heat content, by more accurately representing the upper ocean structure. This will be achieved by using in situ data acquired in different regions of the world's ocean by profiling floats that measure the temperature and salinity vertical structure.

Mentor's Expectation of Student

The student is expected to write a report and produce an oral and/or poster presentation about his/her internship work. He/she will learn the basics about ocean/hurricane interaction, become familiar with handling experimental and satellite data, develop the ability to compare results and draw scientific conclusions.

Discipline of Project and/or Background Needed to successfuly complete the project

Atmospheric Science; Meteorology; Oceanography

Skills

Critical Writing, Oral/Presentation, FORTRAN